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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|-----------------------------|---------------------|------------------|
| 10/551,902 | 02/28/2007 | Alain Ballagny | 279101US6PCT | 6280 |
| 22850 | 7590 | 07/24/2009 | | |
| OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | | |
| EXAMINER DUDNIKOV, VADIM | | | | |
| ART UNIT 3663 | | PAPER NUMBER | | |
| NOTIFICATION DATE 07/24/2009 | | DELIVERY MODE ELECTRONIC | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/551,902

Applicant(s)

BALLAGNY ET AL.

Examiner

VADIM DUDNIKOV

Art Unit

3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-38 is/are pending in the application.
- 4a) Of the above claim(s) 21, 22, 24-26, 28, 30, 32-34 and 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20, 23, 27, 29, 31 and 35-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 October 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 1 Form 1449
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Reply filed 6/4/09 is forming a basis for this Office Action.

Applicant elects in the replies filed 12/22/08, species a. (fissile material is uranium), A (wires having the same composition), A1 (elementary wires have identical diameters), B1 (assembly of elementary wires has a braid form), C1 (assembly is formed by rolling). Applicant's remark regarding secondary use of similar letters (B1 and B2) for marking different subspecies relating to process B1 (second), (processing only one assembly as disclosed on page 11, lines 5-6) and B2 (second), (processing plural assemblies as disclosed on page 11, lines 13-15) is correct. Examiner apologizes for this misspelling. Examiner agrees with Applicant's election of claims for further examination: B1 (second), (processing only one assembly, because claim 36 is elected). Claims 20, 23, 27, 29, 31, 35, 36 and 37 are read as elected. Claims 21, 22, 24-26, 28, 30, 32-34 and 38 are withdrawn from further consideration as non-elected.

Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 20, 23, 27, 29, 31, 35, 36 and 37 should be examined. This restriction requirement is hereby made **FINAL**.

Information Disclosure Statement

2. The information disclosure statement filed 2/1/06 and all other information or that portion which caused it to be listed has been placed in the application file. The information has been considered. Signed copy of Form 1449 has been enclosed.

Drawings

3. The drawings do not show every feature described within the specification and the relationships therein in order to facilitate understanding of the material in which applicant considers his invention. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: reference number 6 in FIG. 1. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The applicant is requested to perform a thorough review of both the drawings and specification to facilitate an appropriate correction to this objection. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Drawings are objected to under 37 CFR 1.75 (d) for not disclosing clearly what is Applicant's invention is.

Specification

4. Specification is objected to because the numbering 6 is presented in FIG. 1 but is not described in the references to FIG. 1 in the specification.

The Specification is objected to as failing to comply with 37 CFR 1.84(p)(5) because the Drawing include the following reference character(s) not mentioned in the description: reference number 6 in FIG. 1. Amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application.

The applicant is requested to perform a thorough review of both the specification and drawings to facilitate an appropriate correction to this objection. The corrected specification is required in reply to the Office action to avoid abandonment of the application. The requirement for corrected specification will not be held in abeyance.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which

it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. The specification is objected to under 35 U.S.C. 112, first paragraph, as failing to provide an adequate written description of the invention and as failing to adequately teach how to make and/or use the invention, i.e., failing to provide an enabling disclosure because the recitation "elementary wires" on page 4, lines 29 is not defined properly and can have different interpretation.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 20, 23, 27, 29, 31, 35, 36 and 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The reasons for this rejection are based on finding of a lack of written support of the claimed subject matter of claims 20 and 35 "elementary wires" for the same reasons as those for the specification

objection in section 5 causing the metes and bounds of the claimed subject matter vague and ill-defined, thereby rendering the claims indefinite.

7. The term "most" in claims 20 and 35 is a relative term which renders the claim indefinite. The term "most" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. .

Claims 23, 27, 29, 31, 36 and 37 are rejected as dependent of claims 20 and 35.

Claim rejections – 35 USC § 103

The following is a quotation of USC 103 (a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. **Claims** 20, 23, 27, 29, 31, 35, 36 and 37 are rejected under 35 U.S.C. 103(a) as being obvious over Seo et al. (US Patent No. 7,430,267 B2, Seo hereinafter) in view of Petrov et al. ("Pick-2 reactor with low consumption of high-enrichment Uranium", atomic Energy, V. 95, No. 4, 674, 2003; Petrov hereinafter) and in view of Applicant's Admitted Prior Art (AAPA, hereinafter). The rejections are provided subject to the noted

indefiniteness under 35 USC 112, 2nd paragraph, as explained above, and are made to the best of examiner's understanding, where the limitations of the claimed invention are assumed not to include limitations "elementary" and "most".

As best as can be understood, regarding claim **20**, Seo teaches: High-density fissile material nuclear fuel (Abstract; monolithic fuel core 12; column 3, lines 26+; uranium density higher than 10 gU/cc; column 3, lines 57+), in a form of an assembly of elementary wires (monolithic fuel core 12; column 3, lines 26+), most of which are constituted by fissile material (uranium density higher than 10 gU/cc; column 3, lines 57+), wherein said elementary wires are assembled by stranding, braiding, or weaving and said assembly is contained in a stainless ductile casing (cladding 16 surrounding circumference of matrix; column 3, lines 28+; Al casing is a stainless ductile casing), and the elementary wires made of fissile material are fine enough to allow for size accommodation of the fuel under effects of irradiation during burnup and for gaseous fission products to be removed.

Seo does not disclose the limitation: deformation of said casing.

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Petrov, drawn to a nuclear fuel, hence analogous art who teaches "a cross-shaped cross section"; (as shown in Fig. 1; page 674, lines 9+). AAPA also teaches a high performance fuel (this tube is then deformed by successive passage into rollers until it has the desired cross shape; page 3, lines 14+).

It would have been obvious to a person of ordinary skill in the art to modify Seo teaching by Petrov and AAPA teaching by deformation of Seo multicore fuel for produce fuel with a higher fission material density and better cooling.

Motivation for said inclusion derives from Petrov teaches: "This results in a high average fuel density in the cell and improves heat transfer ", (page 674, lines 13+).

The limitation of claim 20: "wherein said elementary wires are assembled by stranding, braiding, or weaving and said assembly is contained in a stainless ductile casing" represents a product by the process limitation. The patentability of a product does not depend on its method of production. If the product "nuclear fuel" in the product by process claim is the same as the prior art, the claim is unpatentable even though the prior art product was made by a different process. See In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Also see MPEP § 2113.

The limitation: "the sheet-shaped material before said bending" introduces a time element, and this is a product by process limitation. When interpreted as denoting time, limitations after "before" is have no patentable weight.

The limitation of claim 1: "High-density fissile material" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Limitation of claim 20: "to allow for size accommodation of the fuel under effects of irradiation during burnup and for gaseous fission products to be removed", represents recitation of intended use. The recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In this case prior art structure is capable of performing the claimed functions and meets claim limitation.

On Claim 23, Seo teaches: the fissile material is selected from the group including uranium, plutonium, americium, their alloys or a combination of several of these elements (uranium density higher than 10 gU/cc; column 3, lines 57+).

On Claim 27, Seo teaches: the assembly of elementary wires includes only elementary wires having the same composition (column 3, lines 57+).

On Claim 29, Seo teaches: the elementary wires have identical diameters (column 3, lines 40+).

On Claim 31, Seo teaching: "The number of cylindrical fuel cores is preferably controlled in the range of 2-10" (column 3, lines 40+) has a broadest reasonable interpretation as: "the assembly of elementary wires has a braid form".

On Claim 35, Seo teaches: producing elementary wires having a predetermined composition (column 4, lines 36+), most of which are wires of fissile material (uranium density higher than 10 gU/cc; column 3, lines 57+); producing at least one assembly using said elementary wires (plurality of monolithic fuel core 12 as shown in FIG. 4; column 3, lines 26+); placing the assembly in a stainless ductile casing (cladding 16 surrounding circumference of matrix; column 3, lines 28+; Al casing is a stainless ductile casing).

Seo does not disclose the limitation: shaping the filled casing.

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Petrov, drawn to a nuclear fuel, hence analogous art who teaches "a cross-shaped cross section"; (as shown in Fig. 1; page 674, lines 9+). AAPA also teaches a high performance fuel (this tube is then deformed by successive passage into rollers until it has the desired cross shape; page 3, lines 14+).

It would have been obvious to a person of ordinary skill in the art to modify Seo teaching by Petrov and AAPA teaching by deformation of Seo multicore fuel for produce fuel with a higher fission material density and better cooling.

Motivation for said inclusion derives from Petrov teaches: "This results in a high average fuel density in the cell and improves heat transfer ", (page 674, lines 13+).

On Claim 36, AAPA teaches: Method for producing a nuclear fuel according to claim 35, wherein the casing is a tube, there is only one assembly, and it is shaped by drawing through a drawplate or by rolling (this tube is then deformed by successive passage into rollers until it has the desired cross shape; page 3, lines 14+).

It would have been obvious to a person of ordinary skill in the art to modify Seo teaching by Petrov and AAPA teaching by deformation of Seo multicore fuel for produce fuel with a higher fission material density and better cooling.

Motivation for said inclusion derives from Petrov teaches: "This results in a high average fuel density in the cell and improves heat transfer ", (page 674, lines 13+).

On Claim 37, AAPA teaches: Method for producing a nuclear fuel according to claim 35, wherein the casing is a tube, there is only one assembly, and it is shaped by roller burnishing (this tube is then deformed by successive passage into rollers until it has the desired cross shape; page 3, lines 14+).

It would have been obvious to a person of ordinary skill in the art to modify Seo teaching by Petrov and AAPA teaching by deformation of Seo multicore fuel for produce fuel with a higher fission material density and better cooling.

Motivation for said inclusion derives from Petrov teaches: "This results in a high average fuel density in the cell and improves heat transfer ", (page 674, lines 13+).

Conclusion

9. The following references are cited for disclosing related limitations of the applicant's claimed and disclosed invention:

Wakabayashi (US Patent No. 6,233,299 B1); Travelli (US Patent No. 4,720,370).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vadim Dudnikov whose telephone number is 571-270-1325. The examiner can normally be reached on 8:00 - 17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached, Mon-Fri 7:00am-4:00 pm, at telephone number 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

VD.

/Rick Palabrica/
Primary Examiner, Art Unit 3663